

## 2.0 Alternatives, Including the Status Quo

### 2.1 Introduction

#### 2.1.1 How this Chapter is Organized

Chapter 2 presents the alternatives that have been developed to resolve bycatch issues and to ensure the FMP complies with the bycatch reduction mandates of the *MAGNUSON-STEVENSON ACT*. Each *ALTERNATIVE* describes a *BYCATCH* management program and includes all the parts of the program: the overall objectives, the methods to achieve the objectives, and the reporting and monitoring requirements that would be required. The seven alternatives represent a variety of policies, approaches, and methods to reduce bycatch. The alternatives range from the current methods of reducing bycatch (Alternative 1, the status quo) to more aggressive and comprehensive bycatch reduction policies and methods.

Section 2.1.2 describes the structure of the alternatives, so that they can be compared and understood more clearly. Sections 2.2.1-2.2.7 describe each alternative in detail. Section 2.3 summarizes the anticipated effects or impacts of each alternative in comparison to current conditions.

#### 2.1.2 Structure of the Alternatives

Each alternative includes general goals and/or objectives and the management tools to achieve them. Six alternatives to the *STATUS QUO* have been developed, which provide a range of approaches to reducing bycatch and incidental catch. Some alternatives are more

**Table 2.1. Bycatch Mitigation Tools**

<b>Harvest Levels</b>	
	ABC/OY
	sector allocations
	trip (landing) limits
	catch limits
	individual quotas
<b>Discard Caps</b> (limits and prohibitions)	
<b>Gear Restrictions</b>	
<b>Trawl</b>	mesh size
	footrope diameter/length
	net height
	codend mesh and dimensions
	design: on-bottom or pelagic
	bycatch reduction devices (BRDs)
<b>Line</b>	number of hooks
	hook size
	line length
	retrieval requirements
<b>Pot/trap</b>	number of pots
	pot size
	escape panel in net/pot
	retrieval requirements
<b>Other</b>	setnets (gill and trammel nets)
<b>Time/Area Restrictions</b>	
	seasons
	area closures
	depth closures
	marine reserves
<b>Capacity (number of participants)</b>	
	permits/licenses/endorsements
	limited entry
<b>Capacity (Vessel Restrictions)</b>	
	vessel size
	engine power
	vessel type
<b>Monitoring/Reporting Requirements</b>	
	permits/licenses
	registrations
	Fish tickets (commercial landings/ sales receipts)
	Vessel logbooks
	Surveys
	Punch cards/tags (recreational)
	Port sampling/on-shore observers
	On-board observers
	Vessel monitoring systems (VMS)
	Onboard video recording devices
	Enforcement

comprehensive than others, representing a different balance between regulatory burden, costs and other considerations. Some mandate more data collection than others, thus reducing some of the uncertainty about status of groundfish stocks, *ECOSYSTEM* condition, and management program effectiveness. Some alternatives are more costly and less practicable than others, both to fishers and to the management agencies (both state and federal). The alternatives have been structured to clearly show the *IMPACTS* (effects) of different management approaches and combinations of management tools.

## 2.2 The Alternatives

Table 2.2 at the end of this section provides an abbreviated overview of the generic bycatch mitigation tools included in each alternative. This table does not portray all the details and subtleties of the alternatives, and readers are cautioned to review the text for the full description of the alternatives.

### 2.2.1 Alternative 1: No Action (The Status Quo)

Alternative 1 is the current bycatch management program. It reduces incidental catch and bycatch through a combination of indirect measures: Optimum Yield (OY) specifications, area closures, gear restrictions, trawl fleet reduction, variable trip limits and bag limits, seasons and other measures. High priority is given to minimize cost of catch monitoring. Vessel trip limits are calculated using a computer model and incidental catch ratios from past years.

Under the status quo alternative, the current bycatch management program would not be modified. The current program minimizes bycatch through a combination of Optimum Yield (OY) specifications, gear restrictions, area closures, variable trip limits and bag limits, seasons and other measures, while minimizing the cost of bycatch monitoring. The primary focus of this bycatch program is groundfish species. Disincentives include requirements to sort groundfish catches into established categories

(species or species group), discard *PROHIBITED SPECIES* (salmon, halibut, Dungeness crab), and discard all groundfish that exceed the trip (retention) limits. In addition, estimated bycatch mortalities are deducted from the annual allowable catch levels. Positive incentives include larger trip limits in areas where encounters with overfished species are expected to be low. In addition, a sablefish species endorsement has been established for limited entry fixed-gear vessels, along with permit stacking, individual permit sablefish catch allowances, and a longer season, which greatly reduces the race for fish that occurred in past years. In the Pacific whiting fishery, OY is allocated among four sectors and vessels voluntarily practice bycatch reduction methods that focus on salmon as well as incidental catch of certain groundfish species.

The current bycatch management program uses indirect measures, such as setting an overall OY (catch limit) for various groundfish species and, in some cases,

sub-limits or allocations for fishery sectors. A variety of measures, such as area closures, seasons, and gear modifications are established to ensure groundfish catches do not exceed the specified limits.

Since 1998, groundfish management measures have been shaped by the need to rebuild overfished groundfish stocks. There are more than 80 species in the West Coast groundfish complex managed under the FMP, and many of these species co-occur to different degrees in different areas. Each species has its own habitat affinity associated with depth, substrate, temperature, and portion of the water column. Some have fairly restricted distributions, while others are widespread. Over the past several years, groundfish management measures have been more carefully crafted to recognize the tendencies of overfished species to co-occur with healthy stocks in certain times and areas.

In 2000, the Council refined the management program on the understanding that certain types of *TRAWL* gear cannot be effectively fished in areas where the seafloor is rocky or uneven. Specifically, only *BOTTOM TRAWLS* with large diameter *FOOTROPES* can pass along this type of seafloor without snagging or hanging up on the multitude of obstructions. Use of large footrope trawls was not prohibited, but trip limits were set at such small levels that the economic incentives favored small footrope gear. Allowances were made for use of large footrope gear for deepwater stocks found primarily outside the range of most overfished species. In 2002 the Council introduced a new bycatch analysis model that allowed managers to set trip limits so that more abundant stocks were strongly *TARGETED* in times when they were less likely to co-occur with overfished stocks. The 2002 management measures primarily varied by time (two-month period) and by north-south management area (north of Cape Mendocino, between Cape Mendocino and Point Conception, south of Point Conception, etc.). Beginning in late 2002, the Council began using depth-based area restrictions. These area restrictions are intended to prevent vessels from fishing in depths where overfished species commonly occur, while still allowing some fishing for more abundant stocks in the open areas. The inner and outer boundaries of these closed areas may be adjusted seasonally; the enclosed area may be expanded during periods when overfished stocks are distributed more widely. Conversely, the boundaries may be narrowed when the overfished species are more concentrated or to allow access to other stocks that are more available at certain times. Different closed areas have been established for different gear types, because not all gear types encounter each overfished species at the same rate or in similar areas.

Participation in the *COMMERCIAL* groundfish fisheries is limited by a federal permit system established in 1994. This program limited the number of trawl, *LONGLINE* and *POT* (fish trap) permits and established a number of conditions and requirements. Each permit specifies the type of gear the vessel may use to participate in the limited entry fishery, and the vessel length associated with the permit. A vessel may only participate in the fishery with the gear designated on

its permit(s) and may only be registered to a permit appropriate to the vessel's length. Since 1994, the Council has modified license restrictions for the *LIMITED ENTRY* fixed gear (longline and fish pot gear) to allow vessels to accumulate (stack) and use as many as three sablefish-endorsed permits during the primary sablefish fishery.

The number of trawl permits was reduced in the mid-1990s when seven large *FACTORY-TRAWLER* vessels purchased and consolidated a number of permits in order to participate in the Pacific whiting fishery. A federally-supported trawl *ET AL.*, program in late 2003 retired an additional 92 trawl permits and associated vessels, 35% of all of the groundfish trawl permits in existence at that time. These 92 vessels accounted for 36.5% of the trawl-caught groundfish, including whiting, during the 1998 - 2001 base years. They accounted for about 46% of all the non-whiting groundfish during that period. In addition to eliminating groundfish trawl permits, the program required the retirement of Dungeness crab and pink shrimp permits as well. Vessels remaining in the fishery will pay the costs of the reduction program.

Certain gear types and fisheries are exempted from the limited entry program and remain *OPEN ACCESS*. Trip limits for these vessels are set to allow retention of incidentally-caught groundfish and limited intentional groundfish harvest.

Recreational fisheries off Washington, Oregon, and California are managed by a combination of bag limits, gear requirements, size limits, seasons and area closures. In 2003, most *RECREATIONAL FISHING* was restricted to relatively shallow waters (generally less than 20-27 fathoms).

To reduce fishing in rocky areas of the *CONTINENTAL SHELF*, trip limits for vessels using trawls configured with large footropes (those with footrope diameter greater than 8 inches) are typically set at minimal levels. This creates strong incentives for vessels using bottom trawl gear to avoid prime *ROCKFISH* habitat areas, while not prohibiting the use of such trawls or closing specific areas. Two large areas off southern California are closed to most fishing activities as part of the plan to rebuild overfished cowcod, a species of rockfish. The closed areas (referred to as the Cowcod Conservation Areas or CCAs) encompass the primary habitat of cowcod and are intended to reduce possible encounters with this species.

Trip limits and area closures are currently based on incidental catch rates and fishing patterns through the use of a NOAA Fisheries *BYCATCH MODEL*. The model estimates the total amounts of overfished species that would be caught coincidentally with available target species. The Council uses this information to set the amount and timing of trip limits for target species. The objective is to prevent catches of both target and overfished groundfish species from exceeding their allowable annual harvests. NOAA Fisheries believes this new approach better accounts for the total mortality fishing of the overfished stocks than previous methods.

The bycatch model calculates the co-occurrence of each of five overfished species with healthy targeted stocks. To make these calculations, several trawl fishery target strategies are evaluated (for example, the *DTS COMPLEX* or arrowtooth flounder). Each target strategy has been evaluated in two-month periods to set a baseline of co-occurrence rates of overfished stocks throughout an entire calendar year. The analysis identified seasonal variations in these co-occurrence rates, which have been used to calibrated the model. Trip limits and seasons are intended to allow targeting on healthy stocks during times when incidental catches of overfished species are expected to be lowest (based on recent years' data). Management measures are adjusted as necessary during the season.

The No Action alternative includes continuation of Rockfish Conservation Areas (RCAs) where fishing is greatly restricted. By preventing fishing in times and areas where overfished species are most commonly encountered, the likelihood of catching them is greatly reduced. Outside the RCAs, more liberal fishing opportunities can be provided because co-occurrence rates are lower for overfished species taken with target species. This approach increases the complexity of the regulations and certain monitoring requirements, but avoids the need for an expanded on-board observer program.

The bycatch model uses expected catch amounts for each major fishing sector, calculated before the season opens. Groundfish trip limits for commercial sectors are set based on previously observed ratios with various other species; these trip limits may vary by season if previously observed ratios show seasonal patterns. State fishery management and enforcement personnel monitor commercial *LANDINGS* throughout the year by tabulating state fish landings receipts (*FISH TICKETS*). Although landings of many species are monitored inseason, the landings data for overfished species may not be used for inseason management. Due to the strong economic incentives to avoid reaching an overfished groundfish species OY or cap, coupled with the opportunity to discard fish prior to their being counted, managers assume fish tickets tend to underestimate the actual catches. There is currently no way to verify this inseason. However, onboard *OBSERVERS* ride selected vessels and collect information on amounts and rates of fish discarded at sea. Observer data are not tabulated during the season but are compiled in annual summaries after being matched with fish ticket and trawl *LOGBOOK* records. The new observed groundfish catch ratios are compared to the previous rates that were used to set the current trip limits. If the trip limit ratios differ substantially from the new observations, subsequent trip limits would be adjusted and other management measures may also require adjustments.

### 2.2.2 Alternative 2 (Larger Trip Limits and Trawl Fleet Reduction)

Alternative 2 would continue most of the current bycatch reduction measures and would further reduce the number of commercial fishing vessels. Further reduction in the number of commercial vessels would be expected to enable NOAA Fisheries to increase groundfish trip limit sizes while maintaining as long a fishing season as practicable. Previous analyses have concluded that larger trip limits are associated with less groundfish *REGULATORY DISCARD* (that is, groundfish that vessels must discard to avoid penalty), and particularly the rate of discard. This type of bycatch increases as trip limits become smaller. If Alternative 2 were adopted, the FMP would be amended to specify the maximum number of commercial groundfish permits and a schedule for reducing the fleet to that size. Further analysis of specific options would be necessary to determine the method of reducing the number of commercial fishing permits. A few examples are briefly described below.

This alternative differs from the status quo in that the number of commercial groundfish trawl vessels would be reduced by 50% from the number that were permitted to land groundfish during 2002-2003. Trip limits would be larger because the total allowable catch would be shared among fewer participants.

The preferred method of fleet reduction is an industry-sponsored et al., program. The et al., program reduced the trawl fleet by about 35%, and thus failed to achieve the full 50% reduction in the number of trawl permits. Under Alternative 2, the number of trawl permits would be reduced to the 50% level by other means. The Council has limited alternatives to achieve the additional reduction: eliminate permits by establishing eligibility criteria (for example, a minimum amount of groundfish landed in previous years, a minimum number of years of participation in the fishery, etc), require vessels to hold more than one trawl permit, or allow trawl permits to be converted to fixed-gear permits.

In establishing the current vessel license limitation program, the Council established minimum landing requirements for eligibility. Vessels that met the minimum requirements received licenses (permits). Only the most recent entrants and vessels with the smallest catch histories did not receive permits. It is likely that in reducing the number of eligible vessels, criteria based on amounts of groundfish landed would tend to eliminate those trawl vessels that have caught the fewest groundfish in recent years or participated less than other vessels. This reduction method could result in reducing effective fishing power of the trawl fleet by less than 50%.

Approval of the trawl et al., program in late 2003 has had a substantial effect on this analysis: the status quo (no action alternative) has become very similar to Alternative 2.

### **2.2.3 Alternative 3 (Larger Trip Limits - Shorter Fishing Season)**

Alternative 3 would continue most of the current bycatch reduction programs, but would eliminate the goal of maintaining a year-round fishing season. This alternative would reduce groundfish regulatory discard by increasing groundfish trip limit size and reducing fishing time (shortening seasons), without further reducing the number of trawl vessels. As with Alternative 2, this is based on the understanding that regulatory bycatch of groundfish, and particularly the rate of discard, increases as trip limits become smaller. The specific method(s) of reducing fishing time are not specified in this alternative but are critical to the effects. If this alternative were adopted, further analysis of specific options would be required. Examples are described below.

In contrast to Alternative 2, the number of commercial fishery participants would not be further reduced under Alternative 3. Instead, the commercial fishing season would be shortened in order to allow larger trip limits.

The fishing seasons could be shortened in a variety of ways, and effects on individual commercial fishers would vary. For example, if the current two-month periods were reduced to one month, larger vessels would not be much affected. Such trip limits might not be much larger than the current ones, because actual fishing time per vessel for each two-month period is already less than one month. Another approach would be to allow individual commercial vessels to fish only three of the six two-month periods.

A different way of reducing commercial fishery fishing time to six months would be to allow limited entry sector fishing for six months and open access fishing for six months while the limited entry sector is closed. For example, the limited entry fishery (except the whiting fishery) could operate during two 3-month periods, one in the spring (some period between February and June) and one in the fall (perhaps September, October and November). These open seasons fall mainly outside the shrimp and crab seasons. Open access fisheries might fill in between, i.e., summer and winter.

#### **2.2.4 Alternative 4 (Sector and Vessel Catch Caps)**

Alternative 4 would define fishery sectors and establish specific annual limits on the amounts of overfished groundfish that could be caught by each sector. When a sector reaches an annual catch limit for an overfished species, further fishing by that sector would be prohibited for the remainder of the year. Alternative 4 would modify the definition of *TRIP LIMIT* to include *CATCH LIMITS* for *OVERFISHED* stocks. Like Alternative 1, trip retention limits would continue to be used for non-overfished groundfish stocks. If a vessel reaches a catch limit for any overfished groundfish species, that vessel would be required to stop fishing for all groundfish for the remainder of that period. If a vessel reaches a trip (retention) limit for non-overfished species, the vessel could continue to fish for other species.

Each sector would be monitored separately and would be responsible and accountable for all overfished (or otherwise restricted) groundfish caught. Seven commercial fishing sectors are identified under the current regulations: *LIMITED ENTRY TRAWL*; limited entry *LONGLINE*; limited entry *POT*; three whiting sectors (*CATCHER/PROCESSOR*, *MOTHERSHIP*, and *SHORE-BASED*); and *OPEN ACCESS*. In addition, the tribal fishery and recreational groundfish fisheries are fishery sectors. Additional sectors could be established by subdividing any of these sectors. Under this alternative, each sector would be monitored separately with stratified, partial observer coverage. Catch rates and closure dates for each sector would be projected based on observer reports. If individual commercial vessel caps were adopted, every vessel would need to be monitored.

The inseason catch monitoring or verification program would be upgraded to ensure sector catch limits are not exceeded. Larger retention limits for non-overfished groundfish would be made available to vessels carrying an approved monitoring system (observer or other method).

In order to prevent sector catch limits from becoming a series of derby fisheries, methods to restrict individual vessels would be necessary. The most effective way to do this without increasing groundfish (discard) bycatch would be to establish individual vessel catch limits in addition to the sector caps. Any vessel reaching any catch limit would be required to stop fishing for all groundfish species. These vessel caps would not be transferable between vessels and would expire at the end of each period. Alternatively, vessel trip limits could be continued, and landings of target species would be monitored throughout the season as they are now. Catch of overfished species by each sector would be estimated during the season, based on assumed co-occurrence rates for each sector. Those rates would be adjusted from year to year based on updated observer data. (Another approach would be to set seasons for each target fishery, although this approach could also be taken under the status quo alternative.)

The NOAA Fisheries West Coast Groundfish Observer Program would monitor

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each sector by placing observers on a portion of the vessels in each sector. Catch rates of overfished/restricted species would be projected to all unobserved vessels operating in the sector. Vessels not carrying a NOAA Fisheries-funded observer could carry an observer at their own expense in order to be eligible for the larger trip limits and to gain exemption from the sector caps. An electronic monitoring (video) option may be available if NOAA Fisheries determines such a program would provide the necessary catch/mortality information. This program might require increased retention of certain species to be effective.

Economic (that is, non-regulatory) bycatch/discard could also be addressed under this alternative by prohibiting discard or limiting the amount of groundfish that may be discarded. If allowed, discard would be measured by onboard observers (or electronic monitoring). If discard were prohibited, economic (non-regulatory) bycatch of groundfish would be greatly reduced.

The option of creating more sectors could reduce the need for other controls to limit fishing activities. To accomplish this, vessels would be assigned to one or more sectors, perhaps through an endorsement attached to the limited entry permit. When a sector limit is reached, further fishing by those vessels would be prohibited or severely curtailed. Alternatively, sectors might be defined by target fisheries that would be closed when a catch limit is reached. Bycatch under such an approach could be controlled by requiring *FULL RETENTION* or placing limits on discards. The primary differences between Alternative 4 and the previous three alternatives are: (1) Alternative 4 would assign every vessel to one (or more) sectors; (2) each sector would have a set of annual catch caps for overfished (or other restricted) groundfish species; (3) all vessels in a sector would have to stop fishing when any cap for the sector is reached, while vessels in other sectors would continue fishing; and (4) groundfish mortality caps would be set for overfished groundfish species in addition to retention limits for other groundfish. In addition, if individual vessel caps were established, each vessel would be required to stop fishing when it reached any catch limit during a period. Catches by each sector would be monitored inseason, with actual catch statistics available quickly (either inseason or before the next season) so that adjustments could be made. Total catch OYs and discard caps would be set for overfished *STOCKS*, and sub caps would be set for each sector. Initial trip (retention) limits for vessels without observers would be calculated based on previously observed joint catch ratios of various groundfish species (the same as under status quo). Onboard observers would monitor a subset of vessels in each sector, recording and compiling catch and discard of overfished groundfish species (and other specified species) inseason. This catch data would be expanded to the entire sector. Each sector would be managed to its groundfish caps based on this expanded real time information, rather than based on ratios from previous years. This process would occur weekly, biweekly, or at some other appropriate frequency.

Under Alternative 4, a *RESERVE* could be set aside as a buffer to ensure any species OY or allocation is not exceeded; this reserve could be made available for

vessels and/or sectors observed to have low incidental catch and/or bycatch rates. This would provide incentives for individual vessels to fish more selectively and to carry an observer if one is not provided by NOAA Fisheries. In order to ensure their access to the reserve, vessels may need to carry an observer (or observers) at the vessel's expense so the vessel's catch and bycatch could be monitored accurately.

### **2.2.5 Alternative 5 (Individual Fishing (Catch) Quotas and Increased Retention)**

Alternative 5 would reduce bycatch by assigning annual *CATCH LIMITS*, or *INDIVIDUAL QUOTAS*, or *DEDICATED ACCESS PRIVILEGES*.<sup>1/</sup> to each limited entry commercial fisher, vessel, or other qualified entity. These catch limits would primarily apply to overfished groundfish stocks, but quotas would also be established for other groundfish stocks. Certain gear restrictions and other regulations would be relaxed to allow fishers/vessels to develop their own best practices to catch healthy groundfish stocks while avoiding the catch of overfished groundfish stocks.

Under Alternative 5, it may or may not be useful to distinguish between IQs for overfished groundfish stocks and IQs for other groundfish. In the event that such distinction is appropriate, catch allowances for overfished stocks might be referred to as *RESTRICTED SPECIES CATCH QUOTAS* (RSQs). In the long term, catch limits for other marine life could also be established (which might be referred to as prohibited species catch limits), which could not be retained unless specifically authorized or required.

An IQ or dedicated access privilege would be considered an authorization to catch a specified share or amount of the OY for a specified groundfish stock. A portion of some or all overfished stock OYs would be reserved for vessels with the best bycatch performance. (The Council would define *BEST PERFORMANCE* or *PERFORMANCE STANDARDS* at a later date. For example, it could be based on low catch or catch rates of overfished species, low bycatch of non-groundfish species, or other factors.) A robust monitoring or catch verification program would be established to ensure catch caps are not exceeded.

To increase the effectiveness of IQs/access privileges as a bycatch management

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<sup>1/</sup> In its draft report, the U.S. Commission on Ocean Policy recommends the term dedicated access privileges to highlight the fact that fishing is a privilege, not a right. Also, it is an umbrella term that includes access privileges assigned to individuals (ITQs; IFQs; individual gear quotas), as well as to groups or communities (community development quotas; cooperatives; area-based quotas, community-based quotas). Finally, it reflects the fact that the dedicated privilege being granted is *access* to the fish, rather than the fish themselves.

program, certain regulations would be relaxed to allow fishers to modify their fishing operations and/or gear to better utilize their quotas. For example, gear endorsements could be modified to allow trawl vessels to use nontrawl gear, or to convert their trawl endorsement to a new category of longline, pot, or generic gear endorsement. Quota holders would be allowed to buy and sell incidental catch allowances (RSQs) and individual transferable fishing quotas (IQs/IFQs) for other (non-overfished) groundfish.

There are several potential methods and criteria for initial allocation of quota shares, as well as ownership requirements, and transfer methods. There are also different possible definitions of “individual.” For example, “individual” could refer to or include the vessel, vessel owner, fisherman, person, firm, cooperative, community or other entity. These issues would have to be debated in developing an effective IQ/bycatch management program and are not analyzed in this EIS.

Alternative 5 would use direct incidental catch and bycatch controls at the level of the individual vessel. To reduce economic (non-regulatory) bycatch, discard of groundfish could be prohibited or restricted; if discarding were allowed, it would be measured as accurately as possible. All groundfish catch, whether retained or discarded, would be charged against the appropriate RSQ/IQ. Fewer controls would be needed to limit fishing activities, except that when a vessel reaches any catch limit it would have to stop all fishing until it acquired additional IQ or RSQ. Also, if a groundfish OY were reached, further fishing by all vessels would be prohibited or severely curtailed. Bycatch under this approach could be controlled by requiring *INCREASED RETENTION* or placing limits on discards.

Alternative 5 is similar to Alternative 4 except that each commercial limited entry permit would be assigned annual individual caps (RSQs) for overfished groundfish stocks and IQs/IFQs for other groundfish species, and these would be transferable.

Initially, RSQs would be set for all limited entry commercial vessels. Catch limits for other species would be calculated based on previously observed joint catch ratios of various groundfish species. Onboard observers would monitor catch and discard of overfished groundfish species (and other specified species) inseason. Each vessel would be managed to its caps based on its own performance, using real time catch information rather than relying on ratios from previous years.

A reserve of various groundfish species would be set aside for vessels with the lowest catches or catch ratios of overfished species. Also, any unused OYs of non-overfished groundfish would be made available to those vessels that had not taken their overfished species allowances.

Alternative 5 would require that every commercial groundfish vessel be closely monitored so that all catch of overfished species would be observed and recorded.

This close scrutiny would likely require placing fishery observers on every vessel. Alternative monitoring methods could be allowed if they resulted in the same level of data accuracy and completeness. For example, some vessels might be able to meet the standard by retaining all groundfish in conjunction with a video system to verify that no discard occurred.

### **2.2.6 Alternative 6 (No-take Reserves, Individual Catch Quotas, and Full Retention)**

Alternative 6 would reduce bycatch of all species to very low levels by establishing long-term closed areas where overfished groundfish and other sensitive species are most likely to be encountered, establishing incidental catch limits for individual vessels, prohibiting or severely restricting discard of groundfish species (and perhaps other species), and accurately accounting for all catch. The alternative would emphasize the identification and use of alternative fishing gears and methods that avoid capture of restricted species.

This alternative would use both indirect controls (no-take marine reserves) and direct bycatch controls of each individual vessel. The areas encompassing most of the distribution of all overfished groundfish stocks would be established as long-term marine protected areas to reduce the possibility that those fish could be caught.

Alternative 6 is similar to Alternative 5, except the focus would be on reducing bycatch of overfished groundfish and other identified species to near zero by closing areas where encounters of those species are most likely. These areas could be reopened only through a deliberative process based on the best scientific information available. In addition, individual commercial groundfish vessels would be assigned a catch allowance of overfished groundfish species. These would be mortality limits or caps. Certain regulations would be relaxed to allow fishers to modify their fishing operations and/or gear to keep from exceeding their individual vessel caps.

A portion of the total allowable groundfish catch could be held in reserve for access by vessels with the lowest catch (or catch rates) of overfished species or bycatch rates of non-groundfish species. Initial groundfish catch limits for other species would be calculated based on previously observed joint catch ratios of various groundfish species. Discarding of groundfish would be prohibited or greatly restricted. Discarding of other species could be prohibited or restricted also. Onboard observers would monitor all vessels' catches of all species.

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### 2.2.7 Alternative 7 (The Preferred Alternative)

The Council approved the following motion at its April 2004 meeting as its preferred alternative:

*Create a new Alternative 7 that includes elements of Alternatives 1, 4, and 5. Elements from Alternative 1 that would be included in Alternative 7 would be all current programs for bycatch minimization and management, including but not limited to: setting optimum yield specifications, gear restrictions, area closures, variable trip and bag limits, season closures, establishing landings limits for target species based on co-occurrence ratios with overfished stocks, etc. The FMP would be amended to more fully describe our standardized reporting methodology program and to require the use of bycatch management measures indicated under Alternative 1 for the protection of overfished and depleted groundfish stocks and to reduce bycatch and bycatch mortality to the extent practicable. These would be used until replaced by better tools as they are developed.*

*Elements from Alternative 4 that would be included in Alternative 7 would be the development and adoption of sector-specific caps for overfished and depleted groundfish species where practicable. We anticipate phasing in sector bycatch caps that would include: monitoring standards, full retention programs, and individual vessel incentives for exemption from caps.*

*Elements of Alternative 5 that would be included in Alternative 7 would be the support of future use of Individual Fishing Quota programs for appropriate sectors of the fishery. The FMP would incorporate the Strategic Plan's goal of reducing overcapacity in all commercial fisheries.*

*Additionally, baseline accounting of bycatch by sector shall be established for the purpose of establishing future bycatch program goals.*

Alternative 7 would continue most of the current bycatch reduction measures and would reduce bycatch by expanding the defining catch or mortality limits for overfished species. *CATCH LIMITS* or caps for overfished groundfish species would be established for each fishing sector. All vessels in a sector would be required to stop fishing when a catch limit for that sector is reached. The inseason catch monitoring or verification program would be upgraded to ensure sector catch limits are not exceeded. Larger retention limits for non-overfished groundfish would be made available to vessels carrying an approved monitoring system (observer or other method).

In order to prevent sector catch limits from becoming a series of derby fisheries, methods to restrict individual vessels will continue to be necessary. The most

effective way to do this without increasing groundfish (discard) bycatch would be to establish individual vessel catch limits in addition to the sector caps. However, in the short term this will not be feasible with the current monitoring and catch verification system. Until greatly expanded monitoring is available, the primary means of slowing the rate of fishing will continue to be trip (retention) limits. However, individual vessels may take an observer at their own expense in order to gain exemption from their sector catch limits. Such vessels could be assigned individual catch limits for designated species, and they would agree to stop fishing for all groundfish upon reaching any catch limit. These vessel caps would not be transferable between vessels and would expire at the end of the specified period.

In the short term, vessel trip limits for each sector would be continued, and landings of target species would be monitored throughout the season as they are now. Catch of overfished species by each sector would be estimated during the season based on assumed co-occurrence rates for each sector. Those rates would be adjusted from year to year based on updated observer data. In the longer term, the observer program will be upgraded to provide inseason catch data on overfished species. At that time, catch of overfished species will no longer have to be estimated based on target species landings, and each sector will be managed based on current information.

Eight commercial fishery sectors are identified under the current regulations: limited entry trawl; limited entry longline; limited entry pot; three whiting sectors (catcher/processor, mothership and shore-based); open access; and tribal. The recreational fishery is also a recognized sector. Additional sectors could be established by subdividing any of these sectors. Under this alternative, each sector would be monitored separately with stratified, partial observer coverage. Catch rates and closure dates for each sector would be projected based on observer reports. If individual commercial vessel caps were adopted, every vessel would need to be monitored.

This alternative would modify the definition of trip limits to include catch (mortality) limits and would also establish catch (mortality) caps for each sector. Vessels would no longer be required to discard overfished groundfish species, although they could choose to discard them. Non-overfished groundfish would be managed the same as under the status quo (no action) alternative, except that vessels carrying an observer (or other approved monitoring system, if any) would be eligible for larger trip (retention) limits for non-overfished species. However, they would still be required to stop fishing upon reaching a catch limit. The NOAA Fisheries West Coast Groundfish Observer Program would monitor each sector by placing observers on a portion of the vessels in each sector. Catch rates of overfished/restricted species would be projected to all unobserved vessels operating in the sector. Vessels not carrying a NOAA Fisheries-funded observer could carry an observer at their own expense in order to be eligible for the larger trip limits and to gain exemption from the sector caps. An electronic monitoring

(video) option may be available if NOAA Fisheries determines such a program would provide the necessary catch/mortality information. This could require increased retention of certain species.

Economic bycatch could also be addressed under this alternative by prohibiting discard or limiting the amount of groundfish that may be discarded. If allowed, discard would be measured by onboard observers (or electronic monitoring). If discard were prohibited, economic (non-regulatory) bycatch of groundfish would be greatly reduced.

The option of creating more sectors could reduce the need for other controls to limit fishing activities. To accomplish this, vessels would be assigned to one or more sectors, perhaps through an endorsement attached to the limited entry permit. When a sector limit is reached, further fishing by those vessels would be prohibited or severely curtailed. Alternatively, sectors might be defined by target fisheries that would be closed when a catch limit is reached. Bycatch (discard) under such an approach could be controlled by requiring *FULL RETENTION* or placing limits on discards.

## **2.3 Summary of Environmental Impacts**

The following series of tables summarizes the results of the analysis, following with Table 2.2 that identifies the bycatch mitigation and monitoring tools included in each alternative.

Table 2.3.1 summarizes how well each alternative achieves the stated purpose for the action, that is, how well they achieve the goals and objectives the Council has initially set for the bycatch management program.

Impacts on the biological environment are summarized in Table 2.3.2. Tables 2.3.3(a - c) summarize the social and economic impacts. The significance of those economic impacts is described in Table 2.3.4. These tables are also provided in Chapter 4 where the results are discussed in greater detail.

Table 2.2. Bycatch reduction methods (bycatch mitigation tools) included in the alternatives.

	<u>Alternative 1</u>	<u>Alternative 2</u>	<u>Alternative 3</u>	<u>Alternative 4</u>	<u>Alternative 5</u>	<u>Alternative 6</u>	<u>Alternative 7</u>
<b>Goals and Objectives</b>	Control bycatch by trip (retention) limits that vary by gear, depth, area; long season	Reduce effort in order to create larger or more flexible trip limits (reduce commercial trawl fleet)	Shorten commercial season in order to create larger or more flexible trip limits	Establish sector catch/ mortality caps	Establish individual groundfish catch limits (individual quotas) for the commercial fishery	Close large area closures, tighten gear restrictions, establish individual bycatch caps, and increase	Establish sector catch/mortality caps as appropriate, support individual catch limits (IQs)
<b>FISHERY MANAGEMENT TOOLS</b>							
<b>Harvest Levels</b>							
<b>ABC/OY</b>	Y	Y	Y	Y	Y	Y	Y
<b>Set overfished groundfish catch caps</b>	N	N	N	Y	N	Y	Y
<b>Use trip limits</b>	Y	Y	Y	Y	N	N	Y
<b>Use catch limits</b>	N	N	N	Y	Y	Y	Y
<b>Set individual</b>	N	N	N	Y	Y	Y	Y
<b>Set groundfish discard caps</b>	N	N	N	N	Y	Y	Y
<b>Establish IQs</b>	N	N	N	N	Y	Y	Y
<b>Establish bycatch performance standards</b>	N	N	N	N	Y	Y	Y
<b>Establish a reserve</b>	N	N	N	Y	N/Y	Y	
<b>Gear Restrictions</b>							
<b>Rely on gear</b>	Y	Y	Y	Y	N	Y	Y



Time/Area Restrictions	Y	Y	Y	Y	Y	Y	Y
Table 2.2 (continued). Bycatch reduction methods (bycatch mitigation tools) included in the							
	<u>Alternative 1</u>	<u>Alternative 2</u>	<u>Alternative 3</u>	<u>Alternative 4</u>	<u>Alternative 5</u>	<u>Alternative 6</u>	<u>Alternative 7</u>
Establish long term closures for all groundfish fishing	N	N	N	N	N/Y	Y	N
Establish long term closures for on-bottom fishing	N	N	N	N	N/Y	Y	N
Capacity reduction (mandatory)	Y	Y(50%)	Y	Y	Y	Y	Y
Monitoring/Reporting							
Trawl logbooks	Y	Y	Y	Y	N	Y	N
Fixed-gear logbooks	N	N	Y(100%)	Y	N	N	N
CPFV logbooks	N	N	N	Y	N	N	N
Commercial port sampling	Y	Y	Y	>Y	N/Y	Y	>Y
Recreational	Y	Y	Y	>Y	Y	>>x	>Y
Observer coverage (commercial)	10%	10%	10%+logbook verification	increased, by sector	100%	100%	increased, by sector
CPFV observers	N	N	N	Y	Y	100%	Y
VMS	Y	Y	Y	Y	Y	Y	Y
Post-season observer data OK	Y	Y	Y	N	N	N	N

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Inseason observer data required	N	N	N	Y	Y	Y	Y
Rely on fish tickets as the primary monitoring tool for groundfish	Y	Y	Y	N	N	N	N

Table 2.3.1. Summary of how well alternatives achieve the stated purposes for the proposed action.

Purpose of Proposed Action	Alt 1 (no action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Account for total fishing mortality by species	The current observer program provides statistically reliable estimations of groundfish mortalities.	I+	I+	S+	S+	S+	S+
Establish monitoring and accounting mechanisms to keep total catch of each groundfish stock from exceeding the specified limits	Trip and bag limits, application of the bycatch model and inseason tracking of landings are moderately effective but less than 100% successful.	I+	I+	S+	S+	S+	S+
Reduce unwanted incidental catch and bycatch of groundfish and other species	Area closures (Rockfish Conservation Areas), seasons and gear restrictions, reduce unwanted catch. Trip limits create regulatory bycatch (discard).	I	I	S+	S+	S+	S+
Reduce the mortality of animals taken as bycatch	Prohibited species must be returned to the sea as quickly as possible with minimum of injury.	U	U	U	U	S-	U
Provide incentives for fishers to reduce bycatch and flexibility/opportunity to develop bycatch reduction methods	Trip limits reduce the race for fish and provide some minimal opportunity and incentives to avoid bycatch.	I+	I-	CS+	S+	CS+	S+
Monitor incidental catch and bycatch in a manner that is accurate, timely, and not excessively costly	The current program minimizes user and agency costs of monitoring catch and bycatch at the expense of precision and timeliness.	I	I	S+/S-	S+/S-	S+/S-	S+/S-
Reduce unobserved fishing-caused mortalities of all fish	Area closures (RCAs), gear definitions and seasons mitigate potential mortalities.	I	I	CS+	S+	S+	CS+
Gather information on unassessed and/or non-commercial species to aid in development of ecosystem management approaches.	Over a period of years, information on non-commercial and unassessed stocks will improve.	I	I	CS+	S+	S+	CS+

Performance Ratings, compared to status quo/no action alternative:

Substantial Beneficial (S+): Substantial improvement from status quo expected.

Substantially Adverse (S-): Substantially increased costs or reduced effectiveness expected.

Conditionally Substantial Beneficial (CS+): Substantial improvement expected if certain conditions are met or events occur, or the probability of improvement is unknown.

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Conditionally Substantial Adverse (CS-): Substantially increased costs expected if certain conditions met, or the probability of occurrence is unknown.

Insubstantial Beneficial (I+)/Insubstantial Adverse (I-): Changes are anticipated but not expected to be major.

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the direction or magnitude of the impacts.

Table 2.3.2(a). Summary of effects of Alternatives 1 and 2 on the social and economic environment (Alternatives 3 - 7 in following tables).

	Alternative 1	Alternative 2
Incentives to Reduce Bycatch	Quota-induced discards can occur when fishers continue to harvest other species when the harvest guideline of a single species is reached and further landings of that species are prohibited. As trip limits become more restrictive and as more species come under trip-limit management, discards are expected to increase. In addition, discretionary discards of unmarketable species or sizes are thought to occur widely. However, in comparison to a race for fish allocation system, the current management regime provides harvesters a considerable amount of flexibility to reduce unwanted catch and discards.	Reducing the level of effort in the groundfish fisheries and increasing trip limits would likely reduce the level of groundfish bycatch (discard).
Commercial Harvesters	By spreading out fishing more evenly over the year, the current management regime helps maintain traditional fishing patterns. However, landings of major target species (other than Pacific whiting) are expected to continue to decline as OYs are reduced to protect overfished species. Declining harvests lead to significant decreases in total groundfish ex-vessel value.	Further fleet reduction would be expected to reduce (but not eliminate) extra capacity in the fishery and to restore the fleet to some minimum level of profitability.
Recreational Fishery	Landings of major target species are not expected to increase and may decline further if OYs are reduced to protect overfished species. Decreased harvests lead to significant decreases in recreational value.	Changes in landings of major species targeted in the recreational fishery would be expected to be insignificant.
Tribal Fishery	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant.	Effects as described in Alternative 1
Buyers and Processors	The current management regime reduces the likelihood that processing lines will be idle by fostering a regular flow of product to buyers and processors. However, decreased deliveries of groundfish to processors and buyers will result in significant decrease in groundfish product value.	No significant changes in the total amount of fish delivered to processors is expected. With fewer vessels in the fishery, processors would have fewer boats to schedule for landings. The related reductions in time spent unloading vessels is expected to result in cost savings. However, processors in ports that experience a reduction in fleet size may be negatively affected if they are unable to obtain supplies of fish from alternative sources

Table 2.3.2(a). Summary of effects of Alternatives 1 and 2 on the social and economic environment (Alternatives 3 - 7 in following tables).

	Alternative 1	Alternative 2
Communities	By maintaining year-round fishing and processing opportunities, the current management regime promotes year-round employment in communities. However, groundfish employment and labor income are expected to continue to decline, resulting in economic hardship for businesses involved in the groundfish fisheries. These businesses are expected continue to diversify to reduce dependence on groundfish fisheries.	The direction and magnitude of many of the economic effects on particular coastal communities are uncertain, as the distribution of the post-buyback fleet is uncertain. If further reduction in fleet capacity with higher trip limits were successful in increasing net revenues or profits to remaining commercial fishers, positive economic impacts on the communities where those fishers land their fish, home port and reside would be expected. On the other hand, some communities may experience a significant loss of vessels and a consequent decrease in income, jobs and taxes.
Consumers	The current management regime allows buyers and processors to provide a continuous flow of fish to fresh fish markets, thereby benefitting consumers. Consumers of fresh or live groundfish may be adversely affected by reduced commercial landings. However, changes in benefits to most consumers of groundfish products would be expected to be insignificant due to availability of substitute products.	Effects as described in Alternative 1
Fishing Vessel Safety	Some gains in fishing vessel safety are at least partially realized under the current management regime, as fishers are able to fish at a more leisurely pace and avoid fishing in dangerous weather or locations. However, safety of human life at sea may decrease if reduced profits induce vessel owners to forgo maintenance, take higher risks or hire inexperienced crews.	Increases in net revenue to harvesters resulting from increases in trip limits may enhance their ability to take fewer risks and use their best judgment in times of uncertainty, thereby increasing vessel safety.
Management and Enforcement Costs	The management regime is expected to continue to be contentious, difficult and expensive. Technological developments such as VMS may mitigate the rate at which management costs escalate.	Costs are expected to decrease, as fewer vessels are generally easier and less expensive to monitor.

Table 2.3.2(b). Summary of effects of Alternatives 3 and 4 on the social and economic environment (Alternatives 1 and 2 on preceding table; Alternatives 5, 6 and 7 in following table).

Alternative 3		Alternative 4
Incentives to Reduce Bycatch	If trip limits increase, the level of groundfish bycatch (discard) would be expected to decline.	While it would be in the best interest of all vessels within a sector to reduce the catch of overfished species, a race for fish could develop in which individual vessels eschew fishing practices that reduce bycatch in order to attain their landing limits as quickly as possible. Setting individual catch limits would prevent that. In addition, if cooperative patterns of behavior emerge, decreases in bycatch would be expected.
Commercial Harvesters	A combination of higher trip limits and a reduction in the length of the fishing season would be expected to lead to an overall reduction in variable fishing costs. With larger trip limits, revenues per trip are expected to increase. However, the overall impact of this alternative on costs and revenues would depend on when individual participants were allowed to fish. For example, fishers may be unable to fish for certain species at optimal times.	A reduction in harvest and exvessel revenues could result from early attainment of overfished species sector caps. However, the total amount of fish available for retained harvest would be expected to increase, as vessels would increase retention of groundfish, and the level of bycatch would be measured more accurately through expanded observer coverage. The economic benefit of increased landings must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage. The allocation of catch limits to individual sectors could lead to economic benefits if private agreements allocating transferable harvesting privileges were negotiated.
Recreational Fishery	Effects as described in Alternative 2	This alternative may have a negative economic effect on recreational fishers if its sector catch limit were exceeded. The ability to detect excessive catches within the recreational sector would be enhanced by a CPFV observer program and expanded port/field sampling. The ability of the recreational sector to avoid a fishery closure by controlling catch of overfished species through an incentive program is likely to be limited, as there are many and diverse participants. Dividing the recreational sector into geographical (e.g., state-based) subsectors could mitigate some of the negative effects.
Tribal Fishery	Effects as described in Alternative 1	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant.

Table 2.3.2(b). Summary of effects of Alternatives 3 and 4 on the social and economic environment (Alternatives 1 and 2 on preceding table; Alternatives 5, 6 and 7 in following table).

	Alternative 3	Alternative 4
Buyers and Processors	Larger trip limits would not be expected to affect the total amount of fish that harvesters deliver to processors. However, with vessels taking longer and potentially fewer trips, processors would have fewer boats to schedule for landings and unloading, reducing their average costs. On the other hand, costs could increase if processors were unable to control the flow of product throughout the year and capital is idle during closed periods.	The economic effects on buyers and processing companies are unknown because of the uncertainty as to how well vessel owners within sectors can successfully manage bycatch. To the extent that commercial harvesters adopt bycatch-reducing fishing tactics, processors and buyers would be expected to benefit from higher catches. On the other hand, if an entire fishing sector is shut down, buyers and processors may experience significant shortages of fish.
Communities	The impacts are uncertain, as community patterns of fishery participation vary seasonally based on species availability as well as the regulatory environment and oceanographic and weather conditions. If larger trip limits resulted in increased net revenues or profits to fishers, positive economic impacts on the communities would be expected. On the other hand, seasonal closures could leave crew members at least temporarily unemployed.	To the extent that harvesting sectors are not shut down, no significant economic impact on communities is likely. However, if sector closures occurred, there would likely be negative impacts in fishing communities, particularly if processing plants were also closed.
Consumers	Consumers of fresh or live groundfish could be unable to obtain fish from the same sources for half of the year unless the harvest sectors were split into two groups, with one group of vessels active at any given time.	If no early closures of major harvesting sectors occur, the impact on consumers would be expected to be negligible. However, if major fishing sectors were shut down, consumers of fresh or live groundfish could be adversely affected.
Fishing Vessel Safety	The effects on vessel safety may be mixed. Increases in net revenue to harvesters resulting from increases in trip limits may lead to reductions in injury and loss of life because of harvesters' incentives to take fewer risks and use their best judgment in times of uncertainty. However, set seasons make it more difficult for harvesters to make wise decisions as to when and where to fish.	The effects on vessel safety are uncertain. Possible increases in the profitability of harvesting operations could lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty. If fishers within a sector perceive a greater likelihood of premature fishery closure, vessels would likely be more active early in the year (winter and early spring) when conditions may be more dangerous.
Management and	Effects will vary depending on the way the seasonal	Costs would be expected to increase as catch limits were



Table 2.3.2(b). Summary of effects of Alternatives 3 and 4 on the social and economic environment (Alternatives 1 and 2 on preceding table, Alternatives 5, 6 and 7 in following table). *Groundfish Bycatch Final PEIS Chapter 2 The Alternatives*

	Alternative 3	Alternative 4
Enforcement Costs	closure is structured. Costs are expected to decline if there is no fishing activity to monitor for 6 months of the year. However, there will be increased costs if permit holders are divided into groups.	allocated over an increasing number of sectors. It would be necessary to obtain precise and reliable estimates of the quantities of target and non-target catches within each sector. An expanded port/field sampling program to improve estimates of recreational catch would entail a larger budget for the state and federal agencies currently involved in data collection.

Table 2.3.2(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1 - 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
Incentives to Reduce Bycatch	The amount of fish discarded by each vessel would be counted against the vessel's limit. This measure provides strong economic incentives to reduce the catch of unwanted fish because it internalizes the costs of discarding fish.	Marine reserves would prohibit fishers from fishing in certain areas in order to reduce the probability that fish will be caught and discarded, while the 100% retention requirement would be the primary means of reducing groundfish bycatch (discard) outside of marine reserves. Prohibiting discard would produce a strong incentive to avoid unwanted catch because the costs of sorting, storing, transporting and disposing of fish that cannot be sold may be substantial. If vessel groundfish quotas are transferable, Alternative 6 would be similar to Alternative 5; if not transferable, negative effects would be much more significant and more similar to Alternative 4.	While it would be in the best interest of all vessels within a sector to reduce the catch of overfished species, individual vessels may forgo fishing practices that reduce bycatch in order to attain their landing limits as quickly as possible. Setting individual catch limits would prevent that. In addition, if cooperative patterns of behavior emerge, decreases in bycatch would be expected.
Commercial Harvesters	Current vessel owners as a group would likely benefit from a system that allocates freely transferable quota shares to vessel owners on the basis of catch histories. Moreover, the total amount of fish available for harvest would increase, as bycatch would be measured more accurately through expanded observer coverage. Not all vessel owners would	Some measures would significantly increase fishing costs, while others would reduce them. For example, 100% groundfish retention, full observer coverage, and establishment of marine reserves would increase average costs, whereas the establishment of ITQs for groundfish species would reduce costs.	A reduction in harvest and exvessel revenues could result from early attainment of overfished species sector caps. However, the total amount of fish available for retained harvest would be expected to increase, as vessels would increase retention of groundfish, and the level of bycatch would be measured more accurately through expanded observer

Table 2.3.2(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1 - 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
	benefit equally, and the relative benefits would depend on the allocation formula. In addition, the economic benefits must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage.		coverage. The economic benefit of increased landings must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage. Establishment of allocations among sectors could lead to economic benefits if private agreements allocating transferable harvesting privileges were negotiated.
Recreational Fishery	The creation of tradeable quota shares for the commercial fishing/processing sectors is not expected to apply to the recreational fishery. The possibility of creating ITQs for recreational fishers may exist, but any discussion of how such an allocation would be achieved or its effects on recreational fishers would be speculative.	Rights-based system effects would be as described in Alternative 5. Marine reserves could benefit recreational fishers over the long term if local catch rates and fish size increased due to spillage of adults out of the marine reserves. On the other hand, if marine reserves resulted in geographic redistribution of the commercial and recreational fleets, the concentration of fishing effort in the areas that remain open could lead to localized stock depletion, reduced recreational catch per unit effort, and reduction in the quality of the fishing experience.	This alternative may have a negative economic effect on recreational fishers if its sector catch limit were exceeded. The ability to detect excessive catches within the recreational sector would be enhanced by improved port/field sampling. Incentive programs are likely to be limited, as there are many and diverse participants. Dividing the recreational sector along geographical boundaries could mitigate some of the negative effects.
Tribal Fishery	Effects as described in Alternative 1	Effects as described in Alternative 1	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant. However, potential effects of overfished species allocations are significant
Buyers and Processors	Buyers and processors would be expected to benefit from the anticipated increases in fish landings. The overall level of	The net economic effect on buyers and processors is uncertain. In general, buyers and processors would be expected to	The economic effects on buyers and processing companies are uncertain because of the uncertainty as to how well

Table 2.3.2(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1 - 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
	benefits and the distribution of benefits across processors may depend largely on the formula for allocating quota shares. Arguments have been made that harvester-only ITQ programs may result in stranded capital in the processing sector and a shift in the balance of bargaining power toward harvesters. These potential adverse effects could be mitigated if processors were also allocated quota shares.	benefit from the anticipated increases in fish landings that result from the implementation of a rights-based system. The 100% retention requirement could also result in a large increase in landings. However, it is uncertain how much of the additional fish retained would be marketable. Because of their lack of mobility, buyers and processors may be especially negatively affected by marine reserves. However, the effects of marine reserves on specific buyers and processing companies will depend in part on changes in local supply and how processors have adapted to current supply situations.	vessel owners manage bycatch. To the extent that commercial harvesters adopt bycatch-reducing fishing tactics, processors and buyers would be expected to benefit from higher catches. On the other hand, if an entire fishing sector is shutdown, buyers and processors may experience significant shortages of fish.
Communities	Consolidation of fishing and processing activities to fewer vessels and plants would likely result in reductions in the numbers of crew members and processing workers employed. Granting quota shares to community groups could help maintain existing harvesting and processing patterns and serve to meet concerns about employment in communities.	Effects of a right-based management system as described in Alternative 5. Marine reserves would be expected to help ensure harvests for future generations and the sustained participation of communities in groundfish fisheries. If, however, marine reserves resulted in substantial decreases in groundfish catches over the short term, the economic hardships that fishing families and other members of communities are experiencing under Alternative 1 (no action) would be exacerbated.	To the extent that harvesting sectors are not shut down, no significant economic impact on communities is likely. However, if sector closures occurred, there would likely be negative impacts in fishing communities, particularly if processing plants were also closed.
Consumers	Consumers would be expected to benefit from the anticipated increases in fish landings. There is some chance that consumers could be negatively affected,	Consumers would benefit from the anticipated increased landings that result from a rights-based system. In addition, over the long term, marine reserves that	If supplies of fish remain consistent, the impact on consumers would be expected to be negligible. However, if major fishing sectors were shut down, consumers of

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Table 2.3.2(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1 - 4 in preceding tables).

Alternative 5	Alternative 6	Alternative 7
if a rights-based system leads to a decrease in the overall competitiveness of markets for certain groundfish products (e.g., live fish). The likelihood of this occurring would depend both on the level of consolidation that might occur and the elasticity of demand for particular products.	effectively increase the size and variety of seafood species could make consumers better off. On the other hand, large marine reserves could substantially decrease seafood supply enough to make consumers worse off, at least in the short term. Marine reserves could have a positive effect on those consumers who derive non-consumptive benefits from marine ecosystems, including non-market benefits (e.g., existence value).	fresh or live groundfish could be adversely affected.

Table 2.3.2(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1 - 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
Fishing Vessel Safety	Possible increases in the profitability of harvesting operations would likely lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty.	The net effect of the various measures included in this alternative on fishing vessel safety is uncertain. The establishment of ITQs for groundfish species is expected to promote vessel safety by reducing the pressure to fish under dangerous conditions. On the other hand, the establishment of marine reserves may result in a reduction in fishing vessel safety if the closure of fishing grounds results in vessels fishing farther from port and possibly in more hazardous areas.	The effects on vessel safety are uncertain. Possible increases in the profitability of harvesting operations could lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty. With individual vessel catch limits, some vessels will have more choice of when and where to fish. Winter and early spring fishing may increase if vessels in a sector anticipate premature closures.

Table 2.3.2(c). Summary of effects of Alternatives 5, 6 and 7 on the social and economic environment. (Alternatives 1 - 4 in preceding tables).

	Alternative 5	Alternative 6	Alternative 7
Management and Enforcement Costs	The costs of monitoring, enforcement and administration would be expected to increase significantly. Cost recovery measures such as a fee on quota holders would be expected.	Full (100%) observer coverage would be required, which would facilitate enforcement of a full retention regulation. The enforcement costs of establishing marine reserves vary with several factors, including the location, number, size, and shape of the marine reserves and types of activities restricted and allowed.	Costs would be expected to increase with allocations to multiple sectors. It would be necessary to obtain precise and reliable estimates of the quantities of target and non-target catches within each sector. An expanded port/field sampling program to improve estimates of recreational catch would entail a larger budget for the state and federal agencies currently involved in data collection.

Table 2.3.3. Significance of effects on the biological environment.

Resource	Alt 1 (no action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Groundfish	The current bycatch program provides statistically reliable estimations of groundfish bycatch and bycatch mortalities and mitigates many potential impacts. Trip and bag limits, application of the bycatch model and inseason tracking of landings are moderately effective but less than 100% successful in preventing overfishing. Trip limits create regulatory bycatch of groundfish.	I+	I+	S+	S+	S+	S+
Other Relevant Fish, Shellfish and Squid	Impacts on species such as Pacific halibut are reduced from recent years due to large area closures to protect overfished groundfish (primarily rockfish).	U	U	S+	S+	S+	S+
Protected Species	Area closures (Rockfish Conservation Areas), seasons and gear restrictions reduce potential catches. Protected species must be returned to the sea as quickly as possible with minimum of injury.	I+	I-	CS+	CS+	CS+	CS+
Salmon	Salmon bycatch in the Pacific whiting fisheries is closely monitored. Voluntary bycatch avoidance methods have proven effective, especially in the at-sea sectors	U	U	I+	I+	CS+	I+
Seabirds	Few seabird interactions have been documented; seasons and area closures could increase or decrease interactions.	I+	I-	CS+	CS+	CS+	CS+
Marine Mammals	Few marine mammal takings have been documented, and all are within current standards.	I+	I-	S+/S-	CS+	CS+	S+/S-
Sea Turtles	No sea turtle interactions have been observed in the groundfish fisheries.						
Miscellaneous Species	Area closures (RCAs), gear definitions and seasons mitigate potential mortalities. Little information is available.	U	U	CS+	CS+	S+	CS+
Biological Associations	Over a period of years, information on non-commercial and unassessed stocks will improve. Little information is available at this time.	U	U	CS+	S+	S+	CS+

Significance Ratings, compared to status quo/no action alternative:

Significant Beneficial (S+): Significant improvement from status quo expected.

Significant Adverse (S-): Significantly increased adverse impacts or reduced effectiveness expected.

Conditionally Significant Beneficial (CS+): Significant beneficial impacts expected if certain conditions are met or events occur (such as full observer coverage), or the probability of impacts is unknown.

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Conditionally Significant Adverse (CS-): Significantly increased adverse impacts expected if certain conditions met, or the probability of occurrence is unknown.

Insignificant Beneficial (I+)/Insignificant Adverse (I-): Minor impacts, if any, are anticipated.

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the significance of the impacts.



Table 2.3.4. Significance of effects on the social and economic environment.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Incentives to Reduce Bycatch	CS+/CS-	CS+	CS+	S+	S+	S+	S+
Commercial Harvesters	S+	S+	CS+	CS+/CS-	S+/S-	S+/S-	CS+/CS-
Recreational Fishery	S-	I	I	CS-	I	S+/S-	CS-
Tribal Fishery	I	I	I	CS-	I	CS-	CS-
Buyers and Processors	S+/S-	I/CS-	I/CS-	CS+/CS-	CS+	CS+/CS-	CS+/CS-
Communities	S+/S-	CS+/CS-	CS+/CS-	CS-	CS+	CS+/CS-	CS-
Consumers	S+/S-	I	CS-	CS-	CS+	CS+/CS-	CS-
Fishing Vessel Safety	S+/S-	S+	S+/S-	CS-	S+	S+/S-	CS-
Management and Enforcement Costs	S-	S+	CS+/CS-	S-	S-	S-	S-

## Significance Ratings:

Significantly Adverse (S-): Significant adverse impact based on ample information and the professional judgment of the analysts.

Conditionally Significant Beneficial (CS+)/Conditionally Significant Adverse (CS-): Conditionally significant is assigned when there is some information that significant impacts could occur, but the intensity of the impacts and the probability of occurrence are unknown.

Insignificant Impact (I): No significant change based on information and the professional judgment of the analysts..

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the significance of the impacts.